REMARKS

Status of Claims

Claims 1-5 and Claims 11-16 are pending in the present application.

Claims 6-9 were previously cancelled and remain so.

Claim 10 has been cancelled by the foregoing amendments.

Also by the foregoing amendments, independent Claim 1 has been amended to clarify the novel features of the present invention. It is believed that these amendments are supported by the as-filed specification at page 13, lines 9-13, and page 14, lines 5-13. Moreover, Claim 10 has been cancelled since its features have been incorporated into amended independent Claim 1.

Claim 13 has been amended herein to correct a typographical error.

Present Invention Recited In Current Claims

The present invention relates generally to a method for reducing the emission of waste oxide gas from a waste destruction process. More particularly, as recited in amended independent Claim 1, the method is applicable to a waste destruction process performed in a multi-zone thermal oxidizer which comprises a primary combustion zone and one or more waste destruction zones positioned downstream of the primary combustion zone. The method of the present invention recited in Claim 1 involves the steps of: (a) directing an oxidant stream and a combustion fuel stream to the primary combustion zone of the thermal oxidizer; (b) combusting oxygen and fuel components in the primary combustion zone to produce a hot stream; (c) directing the hot stream to the one or more waste destruction zones; (d) directing at least a portion of a waste stream comprising waste components and reactive waste components, to the one or more waste destruction zones, wherein said reactive waste components form radicals upon exposure to high temperatures and said radicals are reducing radicals capable of removing oxygen from waste oxide gases to convert them to inert compounds, and wherein the reactive waste components are selected from the group consisting of aliphatic hydrocarbons, ammonia, acrolein, hydrogen, hydrogen cyanide, carbon

monoxide, urea, and aromatics; and (e) destroying the waste and reactive waste components in the primary waste destruction zone to produce an effluent stream.

The significance of having reactive waste components in the waste stream is explained in the present Specification at page 14, lines 5-9, i.e., that "[a]s a result of exposure to high temperatures within the thermal oxidizer, some of the reactive waste components form radicals that are capable of removing oxygen from WOG [waste oxide gas] compounds, such as NOx, thereby converting them into inert compounds such as diatomic nitrogen and the like." Thus, it is believed that when the reactive waste components are exposed to the high temperatures of the one or more waste destruction zones, but temperatures which are not as high as those in the primary combustion zone, thermally initiated radicals are formed, exist a little longer, and thereby have a longer period of opportunity to react with waste oxides that were formed in the primary combustion zone, or which may have already been present in the waste stream prior to combustion.

Claim Rejections Under 35 U.S.C. §§ 102(b) and 103(a)

On pages 2-4 of the final Office Action, Claims 1-5 and 10-16 have been rejected, under 35 U.S.C. § 103(a), as being obvious over Cochran et al. US 6,499,412 in view of Beer 5,617,715. Applicants respectfully traverse this rejection for the reasons which follow.

The Examiner asserts that Cochran et al. discloses a method for treating waste streams which comprises feeding the stream comprising NOx and CO to a thermal oxidizer or combustor and combusting the stream to produce a effluent stream comprising nitrogen oxygen, NOx, CO2, CO, VOCs and water. It is noteworthy that the technology described in Cochran et al. addresses the problem of reducing emission of waste oxides from a combustor by adjusting the firebox temperature, whereas, earlier techniques involved adjusting the amount of air in the system and optimization of its distribution (see Cochran et al., Col. 2, lines 25-29 and Col. 5, lines 4-12). In particular, Cochran et al. discloses a feedback loop method wherein the effluent stream of the combustor is analyzed to determine the concentration of carbon dioxide, a waste oxide,

therein, and then that information is provided to a feedback loop software application which determines whether the firebox temperature should be modified. The Examiner also noted that Cochran et al. fails to disclose injecting at a downstream location of a multi-zone thermal oxidizer, which is accurate. Moreover, Cochran et al. fails to particularly describe an advantageous composition for the waste stream which would assist in minimizing waste oxide emissions, whereas the present invention requires that the waste stream comprise "reactive waste components" *which form radicals upon exposure to high temperatures, wherein the radicals are reducing radicals capable of removing oxygen from waste oxide gases to convert them to inert compounds*, such as diatomic nitrogen (see present specification, page 14, lines 5-13), and wherein the *reactive waste components are selected from the group consisting of aliphatic hydrocarbons, ammonia, acrolein, hydrogen, hydrogen cyanide, carbon monoxide, urea, and aromatics.*

According to the Examiner, Beer et al. discloses a method for reduction of NOx emissions comprising introducing into a combustor and combusting, wherein the combustor comprises two zones and waste gas is introduced at a downstream location. It is noteworthy that the process disclosed in Beer at al. is an inverse combined steam-gas turbine cycle which involves burning a fuel having high nitrogen content, in a boiler to raise steam to power a steam turbine. The flue gas of the boiler comprises nitrogen oxides formed during burning in the boiler and is fed to a combustor having a fuel-high zone and a fuel-low zone, to reduce the concentration of nitrogen oxides in the waste stream. Thus, it appears that the Examiner perceives the flue gas and combustor of Beer et al. to be analogous to the waste stream comprising reactive waste components and the multi-zone thermal oxidizer of the claimed invention. Additionally, the fuel-rich zone and the fuel-lean zone of the combustor described in Beer et al. are analogous to the primary combustion zone and the one or more waste destruction zones, respectively, of the multi-zone thermal oxidizer according to the claimed invention. Proceeding on this basis, it is clear that the process of Beer at al. and the claimed invention are different and that modification of the method of Cochran et al. by the

process disclosed in Beer et al. would not result in the claimed invention, as explained hereinbelow.

Initially, it is noted that in Beer et al. (see Col. 4, lines 6-23 and 36-47), the combustor receives a waste stream already comprising excess amounts of nitrogen oxides, which therefore need to be treated and removed. This is accomplished by combusting fuel and air with the waste stream, wherein the combustor comprises a high-fuel zone and a low-fuel zone which are maintained by staging introduction of the combustion air into the combustor. The composition of the waste stream is otherwise unspecified in Beer et al. where as the claimed invention requires that the waste stream comprise "reactive waste components" *which form radicals upon exposure to high temperatures, wherein the radicals are reducing radicals capable of removing oxygen from waste oxide gases to convert them to inert compounds*, such as diatomic nitrogen (see present specification, page 14, lines 5-13), and wherein the *reactive waste components are selected from the group consisting of aliphatic hydrocarbons, ammonia, acrolein, hydrogen, hydrogen cyanide, carbon monoxide, urea, and aromatics*. And so, this deficiency of Cochran et al. noted above is not remedied by combination with Beer et al.

Additionally, contrary to the claimed invention, the fuel, air and waste stream (flue gas) are all fed to the fuel-high zone for combustion of the fuel and conversion of the nitrogen oxides. Claim 7, as well as Col. 5, lines 10-16 of Beer et al., referenced by the Examiner, specify that the "waste gas" from the boiler is introduced to the "first fuel-rich zone at a downstream location" of said gas-turbine combustor, which is entirely different from the present invention which requires that at least a portion of a waste stream comprising waste components and reactive waste components, be directed to the one or more waste destruction zones of the thermal oxidizer. The primary combustion zone of the multi-zone thermal oxidizer is analogous to the first fuel rich zone of the combustor of Beer et al. and, therefore, Beer et al. instructs injection of the waste stream into the primary combustion zone ("where pyrolysis of the fuel occurs at a high temperature," Beer et al. at Col. 4 lines 18-19). Thus, Beer et al. does not in fact teach injection of the waste stream at a downstream location analogous to the one or more

waste destruction zones as recited in present Claim 1, but rather, injection of the waste stream into a downstream location of the first fuel-rich zone, which is analogous to the primary combustion zone of the claimed invention, is disclosed by Beer et al.

Based on the foregoing discussion, it is respectfully submitted that the combination of Cochran et al. with Beer et al. fails to make obvious the present invention recited in amended Independent Claim 1. Moreover, since Claims 2-5 and 11-16 depend, directly or indirectly, from Claim 1, these dependent claims are also believed to be patentable over the combination of Cochran et al. and Beer et al. Thus, withdrawal of this rejection is hereby requested.

Conclusion

In view of the foregoing amendments and discussion, re-examination and allowance of amended independent Claim 1, as well as of dependent Claims 2-5, are hereby requested. Examination and allowance of new dependent Claims 10-16 is also hereby respectfully requested.

A Request for Continued Examination (REC) accompanies this Amendment and provides for payment of the RCE fee.

No additional fees are believed to be due. If, however, any such fees, including petition and extension fees, are due in connection with the submission of this Amendment, the Commissioner is hereby authorized to charge such fees to **Deposit Account No. 18-1850**. In the meantime, please direct all future correspondence relating to the present application to the undersigned attorney.

Respectfully submitted,

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